

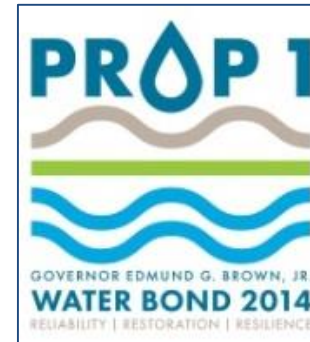


Quarterly Delta Science Update: October 2018 – Item 3

John Callaway, Delta Lead Scientist
Delta Science Program
University of San Francisco



Delta Science Proposal Solicitation Notice (PSN) Out Now!



DELTA STEWARDSHIP COUNCIL
DELTA SCIENCE PROGRAM



Delta Science PSN Priorities

- Habitat restoration support and evaluation
- Interactions between stressors, managed species, and communities
- Habitat requirements of Delta estuarine and migratory aquatic species
- Human dimensions of natural resource management
- Science synthesis
- Monitoring, data management, and modeling

Delta Science PSN Details

- Up to \$12 million across three sources
- Proposals due October 26th
- Single application for all three funding sources
- Major step towards *One Delta, One Science*

10th Biennial Bay-Delta Science Conference

Our Estuary at an Intersection

Sacramento Convention Center

September 10–12, 2018

#BDSC2018

- Over 1000 attendees, 280 presentations, and 150 posters
- Plenary presentations focused on:
 - Adaptive Management
 - Social Science issues
 - Science Communication
- Strong student component

Restoration on Putah Creek Provides Habitat for Chinook Salmon

Eric D. Chapman^{1,3}, Malte Willmes¹, Emily E. Jacinto¹, Gabriel Singer¹, Rachel A. Fichman¹, Levi S. Lewis¹, James A. Hobbs¹, Justin J. G. Glessner², Nann A. Fangue¹, Andrew L. Rypel¹, and Peter B. Moyle¹

¹UCD Department of Wildlife, Fish, and Conservation Biology

²UCD Interdisciplinary Center for Plasma Mass Spectrometry

³ICF Fish and Aquatic Science Team

Eric.Chapman@icf.com



SOLANO COUNTY
WATER AGENCY



Background

Putah Creek Watershed



Restoration

Ecological Applications, 23(5), 2012, pp. 1472–1482
© 2012 by the Ecological Society of America

Restoring native fish assemblages to a regulated California stream using the natural flow regime concept

JOSEPH D. KIERNAN,^{1,2} PETER B. MOYLE,² AND PATRICK K. CRAIN^{2,3}

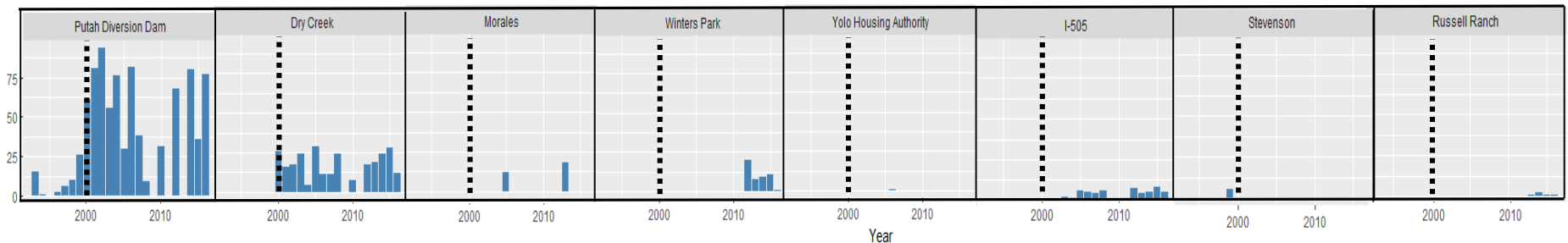
¹*Fisheries Ecology Division, Southwest Fisheries Science Center, NOAA National Marine Fisheries Service, 110 Shaffer Road,
Santa Cruz, California 95060 USA*

²*Center for Watershed Sciences, University of California, One Shields Avenue, Davis, California 95616 USA*

³*ICF International, 636 K Street, Suite 450, Sacramento, California 95814 USA*

Compared 1977-1999 to
2000-2008

Rainbow Trout distribution



Upstream  Downstream

Chinook Salmon Estimates

pre-2014 <10

2014 - 200

2015 - 800

2016 - 1800

2017 - 700



Origin Coded wire tags



Hatchery	2016 - 2017	2017- 2018
Mokelumne	20	38
Nimbus	2	5
Feather	1	3
Coleman	0	3

Origin Otolith microchemistry

December 2016 -January 2017

CNH - Coleman National
Fish Hatchery

FEA - Feather River

FRH - Feather River
Hatchery

PUC - Putah Creek

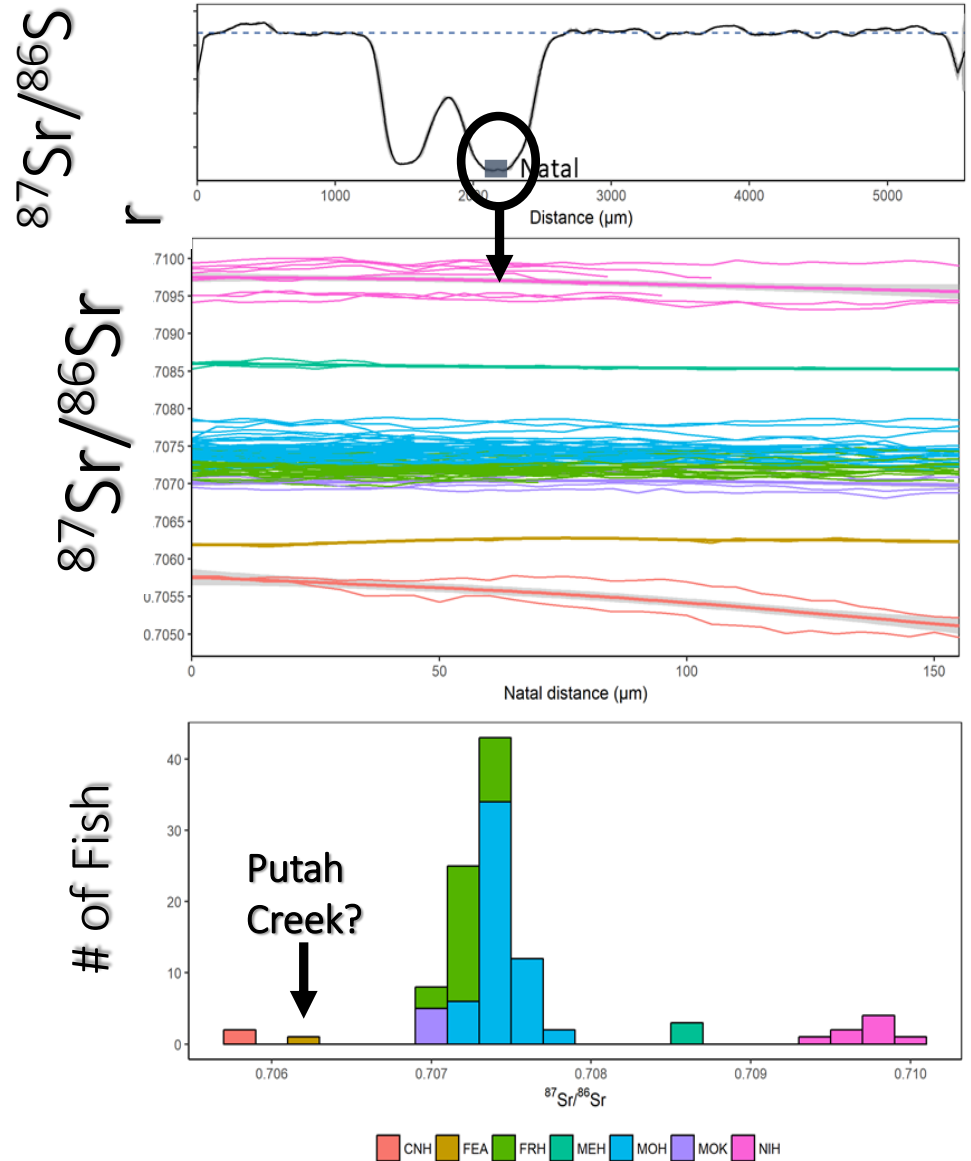
NIH - American River

Nimbus

MOK - Mokelumne River

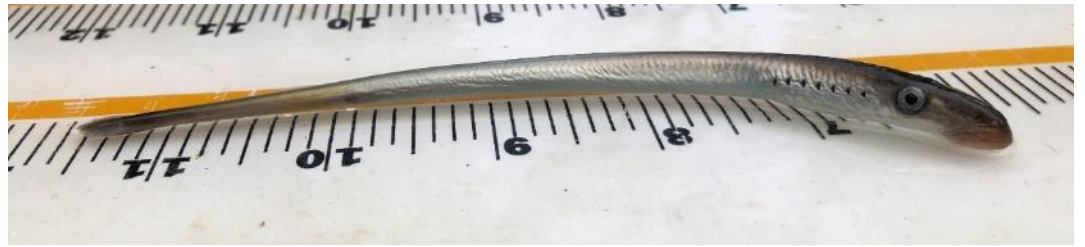
MOH - Mokelumne River
Hatchery

MEH - Merced River
Hatchery



Slide provided by Eric Chapman

Conclusions



- A lot more adults utilizing Putah Creek since 2013
- Strays from at least five rivers seen in Putah Creek
- Putah Creek has been restored such that it favors native fishes
- Restoration provided novel habitat for fall-run Chinook Salmon to recolonize
- Spawning and emigration are successful *at least the taggable sized fish*
- Is a run being established?



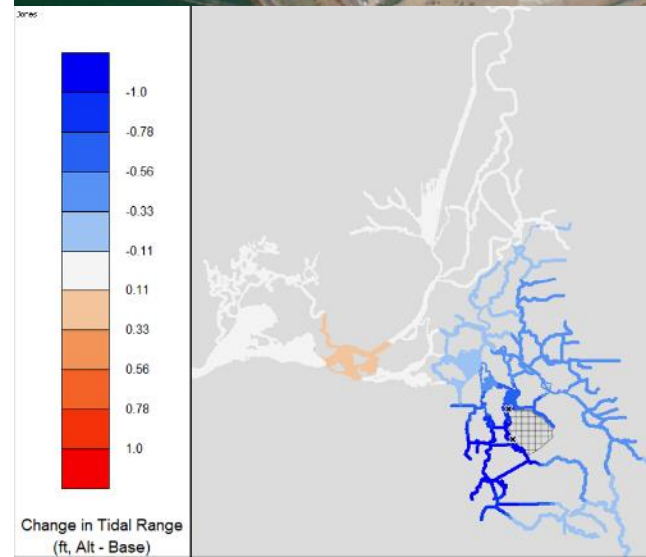
Anticipating and communicating regional effects of reconfiguration of Delta geometry

John DeGeorge
Stephen Andrews
Stacie Grinbergs
Richard Rachiele

Integrated Modeling Steering Committee Meeting
August 22, 2018

Slide provided by John DeGeorge

Resource Management Associates, Inc.



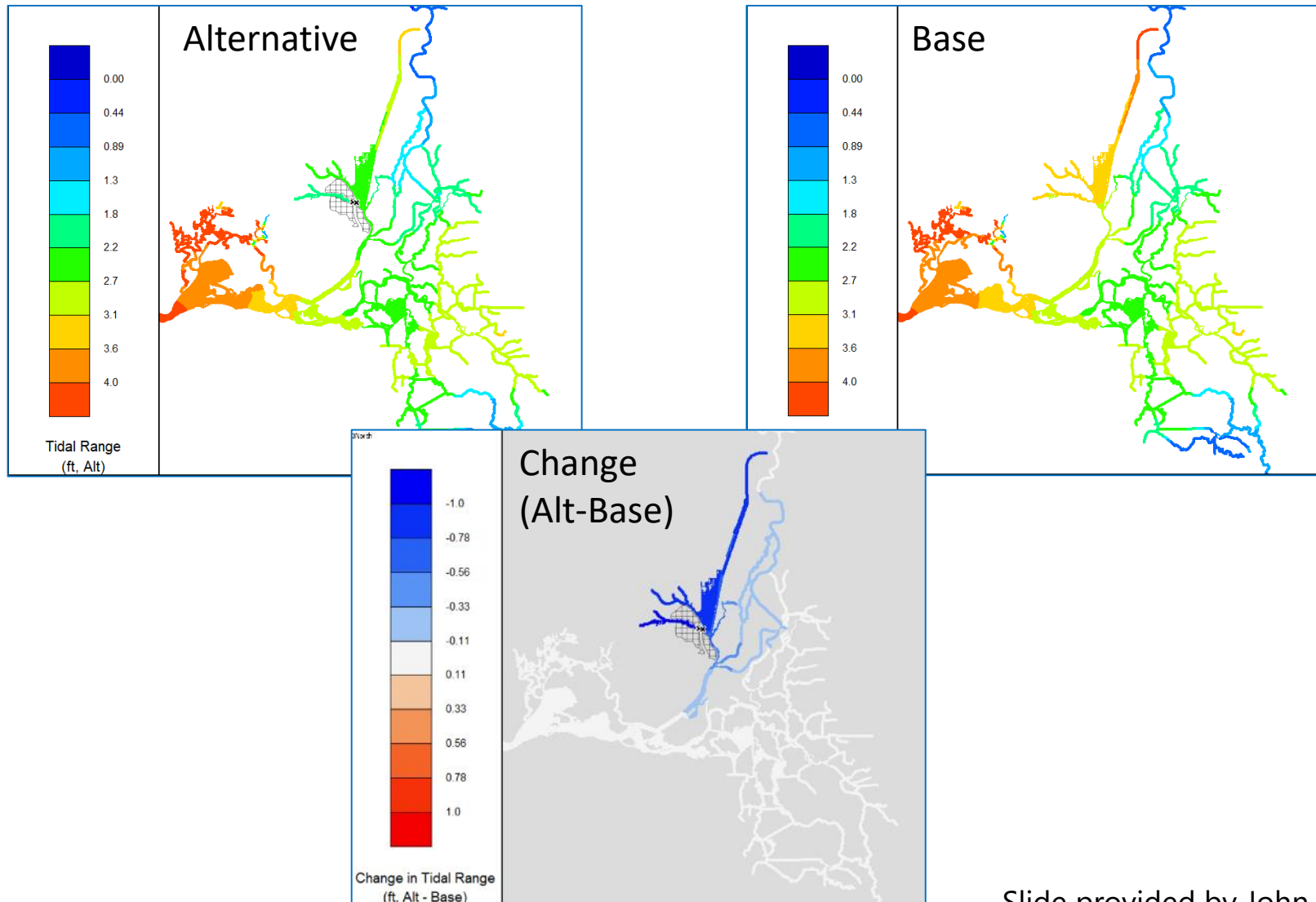


Overview

- Observation – Many modeling studies and a few real events have shown that changes in Delta geometry may have important local and regional effects on flow and transport
- Premise – Understanding these impacts can provide useful input and guidance for a wide range of management actions

Tidal Range: Alternative, Base, Change

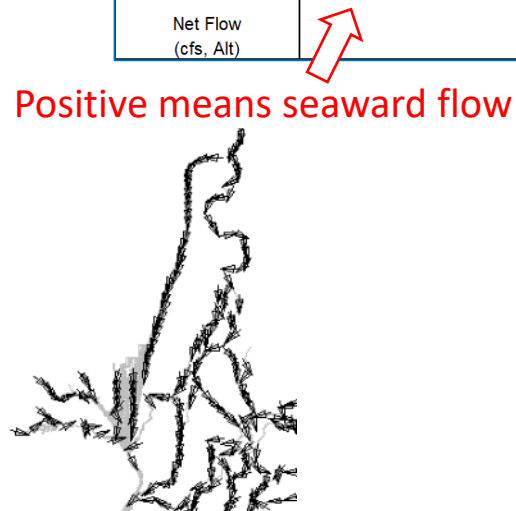
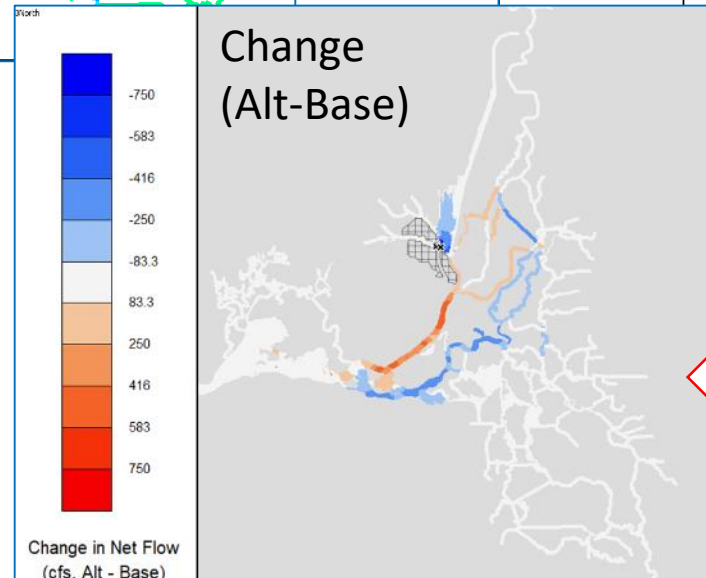
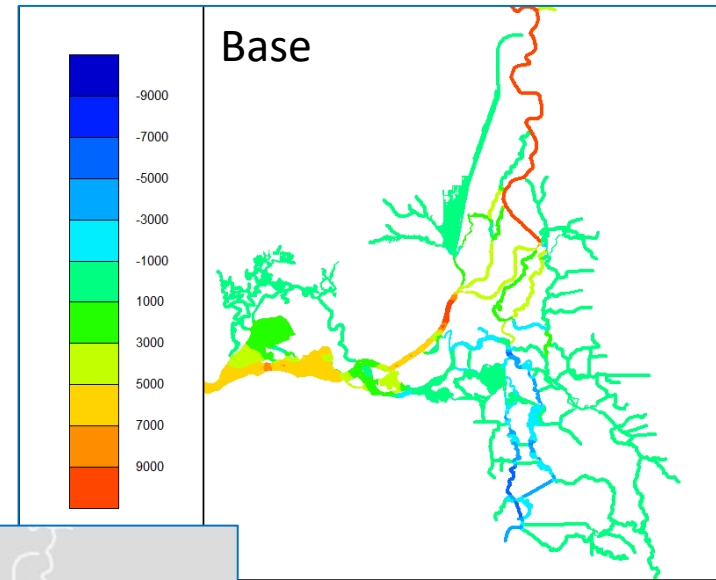
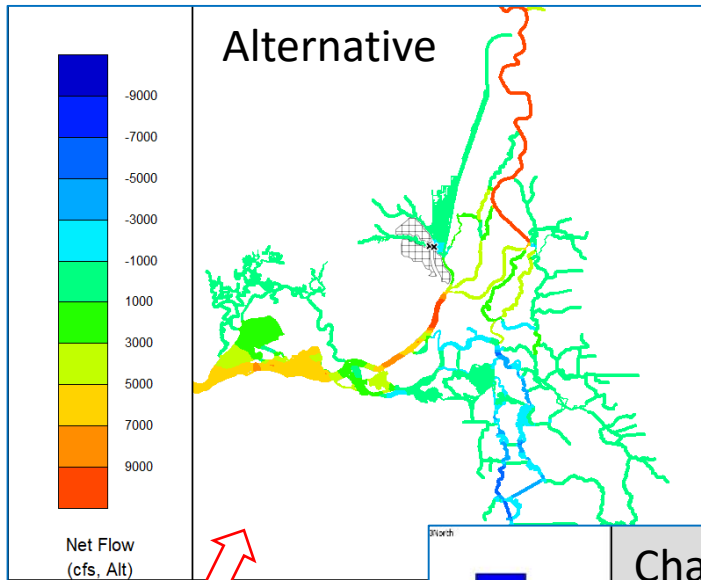
breaches on Hastings, Egbert, Little Egbert



Slide provided by John DeGeorge

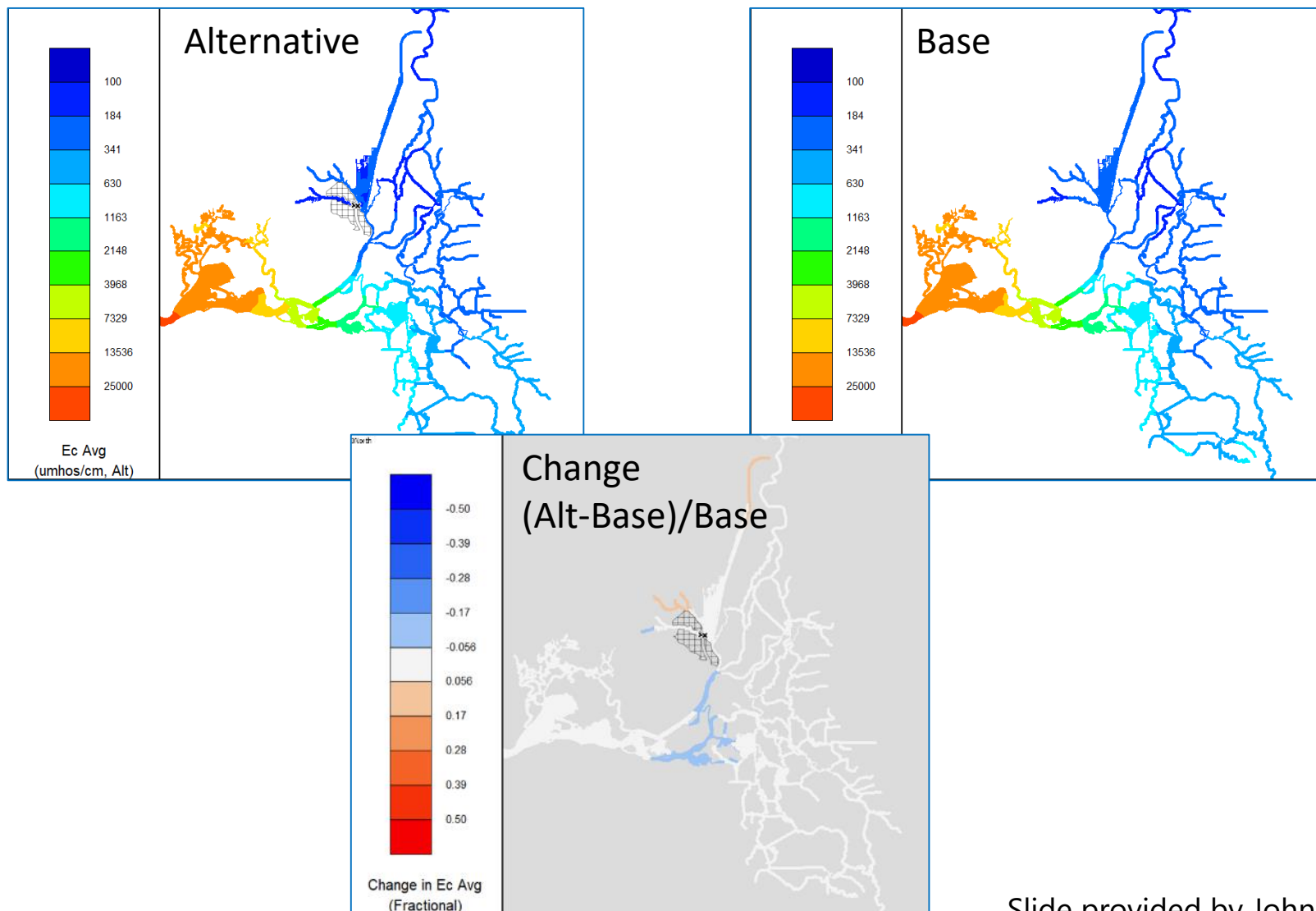
Net Flow: Alternative, Base, Change

breaches on Hastings, Egbert, Little Egbert



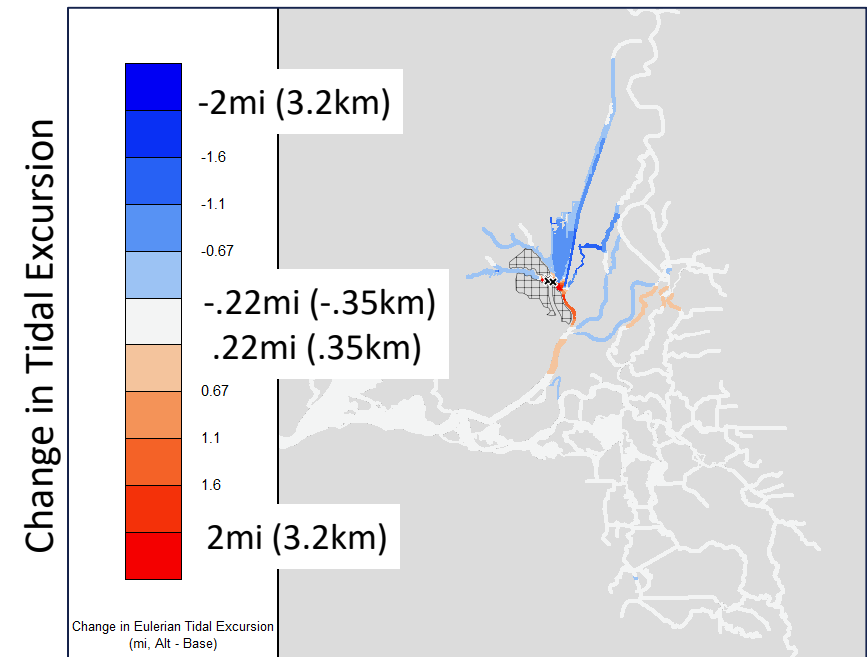
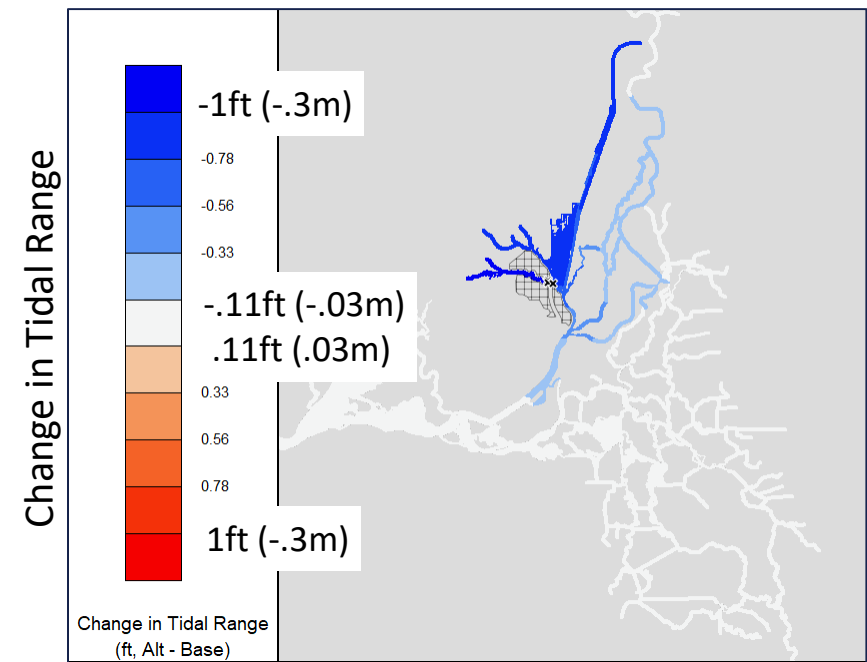
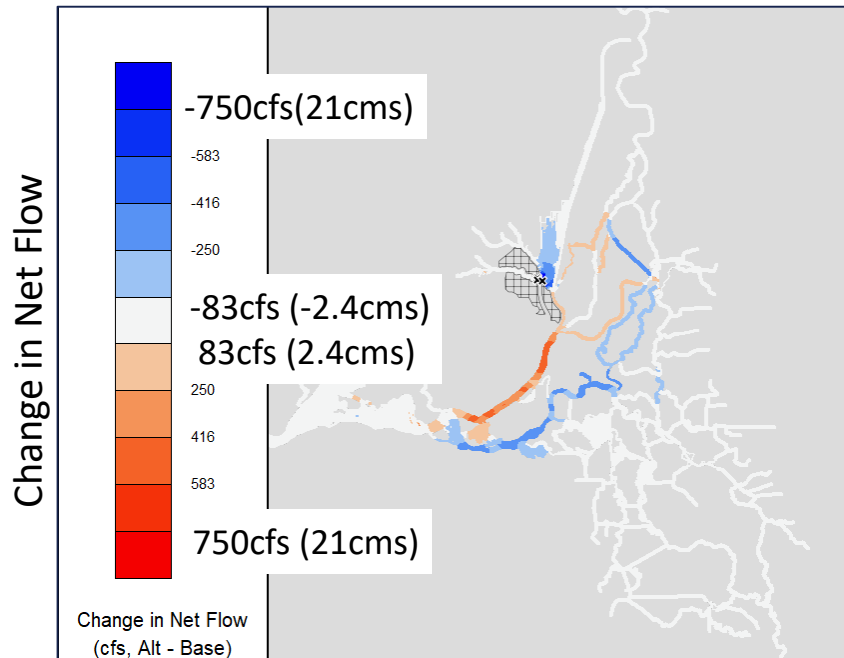
Positive means increase in seaward flow, or a decrease in upstream flow

EC (September Average): Alternative, Base, Change breaches on Hastings, Egbert, Little Egbert



Regional Patterns North Delta

Hastings/Egbert/Little Egbert



Integrating multiple data types to improve understanding of the North Delta

Larry Brown, Anke Mueller-Solger, Jon
Bureau, Elizabeth Stumpner, Jessica Lacy,
Tara Morgan, Fred Feyrer, Matthew
Young, Francis Parchaso, Jared Frantzich,
Luke Loken, Erwin Van Nieuwenhuyse,
USBR, UCD, DWR, and a host of other
people and groups

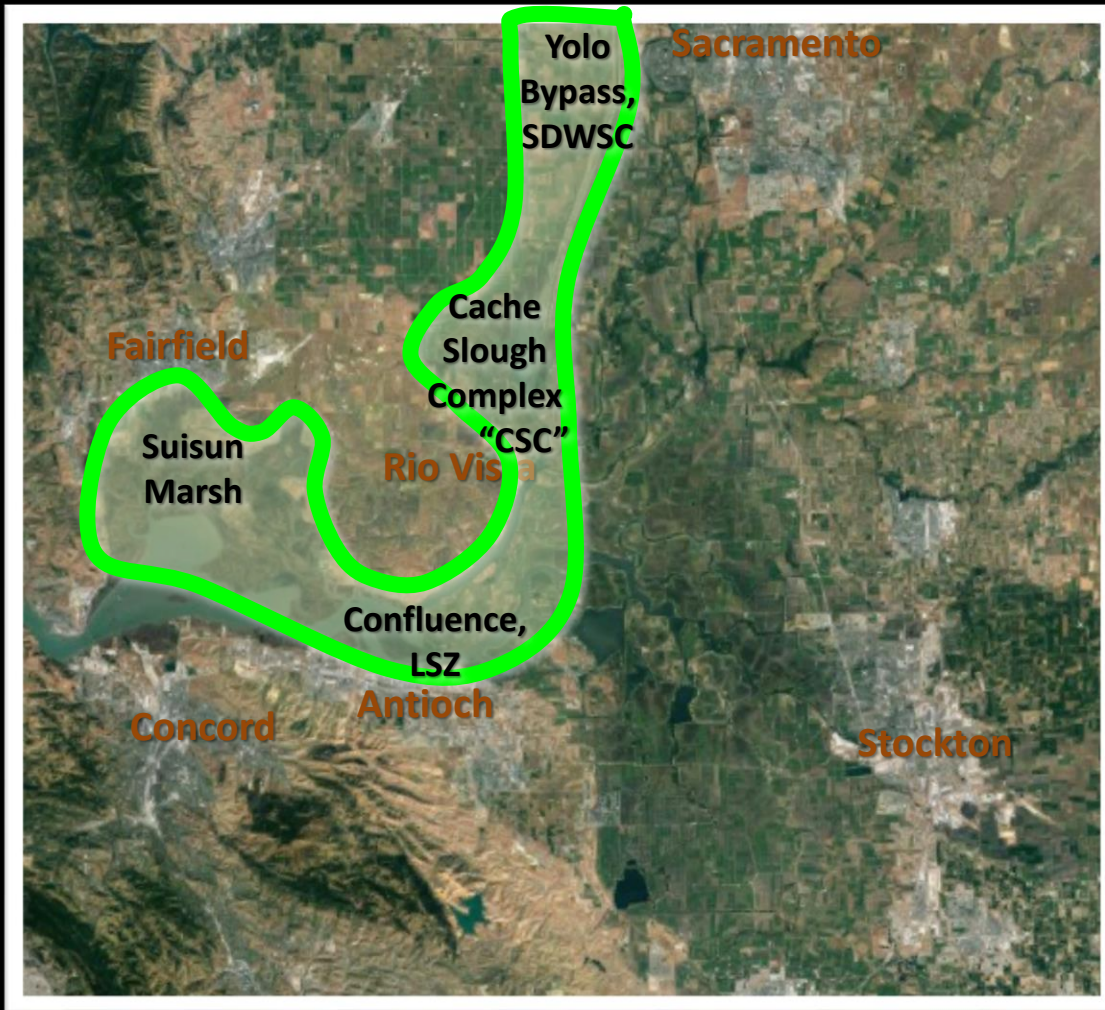
Funding: USBR



Slide from Bay-Delta Science Conference presentation
by Larry Brown, USGS, 9/12/2018, Sacramento, CA

Why is this important?

“Yolo-North Delta-Suisun Habitat Arc”



- North Delta is a key part of the Arc
- Represents an important part of fish restoration strategies

Slide from Bay-Delta Science Conference presentation
by Larry Brown, USGS, 9/12/2018, Sacramento, CA

Site Level Comparisons

Wildlands



Dendritic Marsh

- Dendritic marsh habitat
- Intentionally “restored” in 2010
- 100 ac marsh plain, 8 ac channels
- Isolated
- Little hydrodynamic exchange

Little Holland Tract

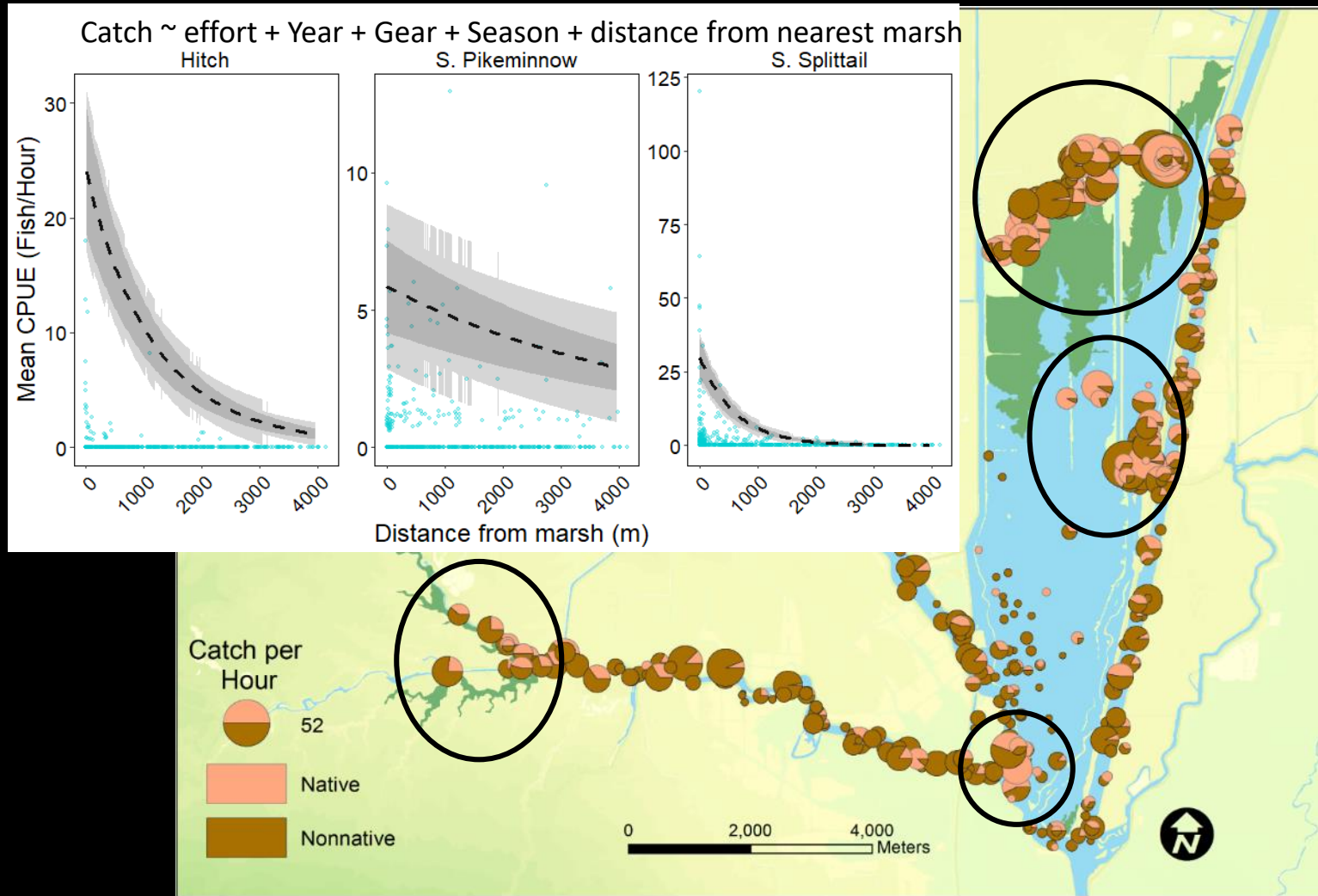


Leaky Lake

- Open water habitat
- Unintentionally “restored” in 1983
- 1,500 acres open water & marsh
- Connected
- Large hydrodynamic exchange (2/3)

Slide from Bay-Delta Science Conference presentation
by Larry Brown, USGS, 9/12/2018, Sacramento, CA

Regional Patterns



Slide from Bay-Delta Science Conference presentation by Larry Brown, USGS, 9/12/2018, Sacramento, CA. These data are preliminary, predecisional and subject to revision.

(from Young et al. 2018)

Major Points

- Dendritic vs. Leaky Lake
 - Dendritic has: higher residence time, more zooplankton, more fish
- Invasive fishes will reduce restoration benefits to native fishes?
 - Invasive fish species do dominate the landscape; however, this varies with region and habitat type
 - We can favor native species as we learn more about their habitat responses

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image from <http://www.d3d-baydelta.org/>